

# Preventive HIV Vaccines

## What is a vaccine?

A vaccine is a medical product designed to stimulate your body's immune system in order to prevent or control an infection. An effective preventive vaccine trains your immune system to fight off a particular **microorganism** so that it can't establish a serious infection or make you sick.

## What is the difference between a preventive HIV vaccine and a therapeutic HIV vaccine?

*Therapeutic* HIV vaccines are designed to control HIV infection in people who are already HIV positive (see [Therapeutic HIV Vaccines Fact Sheet](#)). *Preventive* HIV vaccines are designed to protect HIV negative people from becoming infected or getting sick. This fact sheet focuses on preventive HIV vaccines.

Although there is currently no vaccine to prevent HIV, researchers are developing and testing potential HIV vaccines. The goal is to develop a vaccine that can protect people from HIV infection, or at least lessen the chance of getting HIV or AIDS should a person be exposed to the virus.

## How does a preventive vaccine work?

When your body encounters a microorganism, your immune system mounts an attack on the invader. After the microorganism is defeated, your immune system continues to "remember" how to quickly beat the invader should it try to infect you again.

A vaccine is designed to resemble a real microorganism. The vaccine trains your immune system to recognize and attack the real microorganism should you ever encounter it. If you've received an effective vaccine, your immune system will "remember" how to quickly attack and defeat a particular microorganism for many years.

### *Terms Used in This Fact Sheet:*

**Antibody:** a protein produced by the body's immune system that recognizes and fights infectious organisms and other foreign substances that enter the body. Each antibody is specific to a particular piece of an infectious organism or other foreign substance.

**Clinical trial:** a scientifically designed study testing the safety and effectiveness of a medication or other treatment in human volunteers.

**Gene:** a short segment of DNA or RNA that acts as a blueprint for building a specific protein.

**Genetic engineering:** a laboratory technique that can produce custom-made proteins for use as drugs and vaccines.

**Microorganisms:** small life forms that can be seen only through a microscope, including bacteria, protozoa, viruses, and fungi.

**Vector:** a harmless virus or bacteria used as a vaccine carrier to deliver pieces of a disease-causing organism (such as HIV) into the body's cells.

## Can an HIV vaccine give me HIV or AIDS?

The experimental HIV vaccines currently being studied in **clinical trials** do not contain any "real" HIV, and therefore cannot cause HIV or AIDS. However, some HIV vaccines in trials could prompt your body to produce **antibodies** against HIV. These HIV antibodies could cause you to test "positive" on a standard HIV test, even if you don't actually have HIV. New tests are being developed to distinguish between vaccinated and infected people. For more information about this issue, please visit <http://www.hvtm.org/science/volunteerfaqs.html> (click on "Will I test HIV-positive as a result of the vaccine?").

## Preventive HIV Vaccines (continued)

### What are the different types of vaccine?

There are three main types of vaccines that are being studied for the prevention of HIV infection and AIDS:

- **Subunit vaccines**, also known as "component" or "protein" vaccines, contain only individual parts of HIV, rather than the whole virus. Instead of collecting these parts from the virus itself, the HIV subunits are made in the laboratory using **genetic engineering** techniques. These man-made subunits alone—without the rest of the virus—can prompt the body to produce an anti-HIV immune response, although that response may be too weak to actually protect against future HIV infection.
- **Recombinant vector vaccines** take advantage of non-HIV viruses that either don't cause disease in humans or have been deliberately weakened so that they can't cause disease. These weakened (attenuated) viruses are used as **vectors**, or carriers, to deliver copies of HIV **genes** into the cells of the body. Once inside cells, the body uses the instructions carried in the copies of HIV genes to produce HIV proteins. As with subunit vaccines, these HIV proteins can stimulate an anti-HIV immune response. Most of the recombinant vector vaccines for HIV deliver several HIV genes (but not the complete set) and may therefore create a stronger immune response.

Some of the virus vectors being studied for HIV vaccines include ALVAC (a canarypox virus), MVA (a type of cowpox virus), VEE (a virus that normally infects horses), and adenovirus-5 (a human virus that doesn't usually cause serious disease) based vectors.

- **DNA vaccines** also introduce HIV genes into the body. Unlike recombinant vector vaccines, DNA vaccines do not rely on a virus vector. Instead, "naked" DNA containing HIV genes is injected directly into the body. Cells take up this DNA and use it to produce HIV proteins. As with subunit and recombinant vector vaccines, the HIV proteins trigger the body to produce an immune response against HIV.

Again, none of these vaccines contain real HIV or anything else that could cause HIV infection or AIDS.

### What is a prime-boost vaccination strategy?

A single type of HIV vaccine may be used alone, or it may be used in combination with another type of HIV vaccine. One approach to combined HIV vaccination is called the *prime-boost strategy*. In this approach, administration of one type of HIV vaccine (such as a DNA vaccine) is followed by later administration of a second type of HIV vaccine (such as a recombinant vector vaccine). The goal of this approach is to stimulate different parts of the immune system and enhance the body's overall immune response to HIV.

### How can I participate in a vaccine clinical trial?

Clinical trial volunteers are tremendously important in the effort to develop a preventive HIV vaccine. To find an HIV vaccine trial near you, contact AIDSinfo toll-free at 1-800-448-0440 to speak to an Information Specialist, who will help you locate trials in your area. You can also locate research sites using the AIDSinfo Vaccine Web page at <http://aidsinfo.nih.gov/Vaccines/>. On the left side of the screen, under "Preventive HIV Vaccine Trials," click "New and Recruiting Trials" for a complete list of currently recruiting preventive HIV vaccine studies.

Enrolling in a clinical trial isn't the only way to help the HIV vaccine effort—there are other ways to participate. Consider serving on an HIV vaccine Community Advisory Board. Get involved with outreach and community education programs. Lobby your elected officials to support HIV vaccine research and development. Or volunteer in other HIV/AIDS prevention, treatment, and support efforts—all are valuable ways to contribute.

### For more information about HIV vaccines:

<http://www.vrc.nih.gov/VRC/>

<http://www.hvtn.org/>

Or contact your doctor or an AIDSinfo Health Information Specialist at 1-800-448-0440 or <http://aidsinfo.nih.gov>.